GOVERNMENT OF THE DISTRICT OF COLUMBIA

Project: Voice and Data Infrastructure
Cable Installation

BLANKET STATEMENT OF WORK

I. Project Description

As part of an effort to insure the District of Columbia government's physical infrastructure for voice and data telecommunications meets or exceeds industry-wide standards and specifications, the Office of the Chief Technology Officer (OCTO) has determined the minimum technical requirements for voice and data cabling used by all District Government agencies. As authorized by District of Columbia Municipal Regulations (DCMR) (1-1402), the OCTO provides telecommunications oversight for all agencies within the District government and acts as an agent for various District agencies in securing a compliant, high-performance voice and data network structured cabling systems. The OCTO works with individual agencies to determine their requirements; assists in the preparation an agency specific Statements of Work (SOW); reviews quotations, inspects the work of various contractors and recommends the acceptance or rejection of the effort. As the authorizing agent, OCTO is not responsible for any changes to the initial scope of the task or project once a contractor quotation has been accepted. The OCTO shall not be held responsible for any activity increasing the scope of effort unless specifically requested in writing from the OCTO. Deviations from the requirements of this Statement of Work must be issued on agency letterhead and countersigned by a responsible OCTO representative.

PURPOSE: This document details the minimum services and practices the Contractor shall provide the District Government as part of their proposal for the installation of voice and/or data cabling infrastructure. The requirements in this Blanket Statement of Work shall be incorporated in any proposal, contract, Blanket Purchase Agreement or task order to perform voice or data infrastructure cabling for the Government of the District of Columbia.

UNDERSTANDING OF THE TECHNICAL REQUIREMENTS: The Chief Technology Officer (CTO) desires to maximize the utilization of any existing cabling system that is compliant with current ANSI/TIA/EIA specifications and recommendations for voice or LAN cabling. The Contractor shall dedicate the time and resources necessary to develop a thorough understanding of the technical requirements for this request and the business goals of the agency, the CTO and the District government. The Contractor shall meet or exceed these requirements, as specified. The Contractor must understand that a standardized, intelligent distribution network allowing efficient and effective centralized management must be in place as the foundation for our strategic plan. The technical design and cable components used in our communications infrastructure are straightforward in design. The infrastructure is based on proven state-of-the-art industry-standard techniques and technologies.

DEFINITIONS: For the purposes of this Statement of Work, the following additional definitions shall apply.

ACP – Association of Cabling Professionals. A telecommunications body serving the cabling and building industries that develops standardized installation practices.

ANSI – American National Standards Institute. The administrator and coordinator for the United States private sector voluntary standardization system.

BICSI – Building Industry Consulting Services International. An international telecommunications body serving the building industry that develops standardized installation practices. The Telecommunications Distribution Design Manual (TDMM) published by BICSI is used as the reference for the installation practices for telephone and data cabling. All references to the BICSI TDMM refer to the current edition.

CENELEC – European Committee for Electrotechnical Standardization. The administrator and coordinator for the European private sector voluntary standardization system.

CSA – Canadian Standards Association. A Canadian testing and certification agency comparable in function to the Underwriter's Laboratories.

CTO – Chief Technology Officer. The CTO has oversight and approval of all technology projects conducted within the District of Columbia as prescribed by District law.

ECMA – European Computer Manufacturer's Association – An international industry association that promulgates and publishes industry-wide standards insuring compatibility between devices and systems.

EIA/TIA – Electronic Industries Association, Telephone Industries Association. Electronic and telephone Industry associations that promulgate and publish industry-wide standards insuring compatibility between devices and systems.

ETL – Electrical Testing Laboratories. An independent testing laboratory that provides product testing and certification.

IDC – Insulation Displacement Contact

IEEE – Institute of Electrical and Electronics Engineers, Inc. An international organization that is responsible for promulgating and publishing minimum standards insuring compatibility between devices and systems.

FCC – Federal Communications Commission. The US Government agency having the power to regulate all electrical communications systems originating in the United States including radio, television facsimile, telegraph, telephone and cable systems.

ISO – International Organization for Standardization. An international organization with the responsibility for developing, promulgating and publishing international standards that relate to health, safety and practices.

NEMA – National Electrical Manufacturers Association. An industry association with the responsibility for developing, promulgating and publishing standards that relate to health, safety and practices.

NFPA 70 NEC – National Fire Protection Association, National Electrical Code. A nationally recognized code containing provisions that detail the practical safeguarding of persons and property from hazards relating to the use of electricity. All references to the NEC refer to the current edition.

OCTO – Office of the Chief Technology Officer. See CTO.

Outside Plant (OSP) – Cable and equipment designed for exposure to the elements or burial without enclosing in conduit or other protective sheathing.

TIA/EIA – See EIA/TIA.

UL – Underwriter's Laboratories. A non-profit corporation established to maintain and operate laboratories for the examination and testing of devices, systems and materials to determine their relation to hazards to life and property.

WAO – Work Area Outlet. The outlet at which horizontal cabling is terminated at the user's workstation location. A WAO may be located in a floor, wall or systems furniture space.

II. GENERAL SCOPE OF WORK ITEMS

1. Provide support for the general objectives of this scope of work:

   (a) The Contractor shall provide an industry-standard and compliant, high-performance structured cabling system design that meets or exceeds all current standards and accommodates multi-media applications. The resulting design shall utilize any existing and compliant Category 3 and 5 legacy cabling systems and equipment whenever possible. The Contractor's site survey and this Blanket Statement of Work shall form the basis for the Contractor's quotation. The Contractor shall install, test and certify the structured cabling infrastructure to support the agency and CTO requirements on a firm fixed-price (FFP) basis.

   (b) The Contractor shall perform a physical site survey for each specified site and provide the requesting agency and the CTO with a detailed infrastructure design and installation plan that incorporates and maximizes the use of any existing compliant cable infrastructure. The plan shall indicate the number and types of cables proposed, recommended outlet locations and contain a project Gantt chart with applicable tasks, work breakdown structure, milestones showing completion dates and other logic leading to a successful project prior to beginning the cabling effort.

   (c) The Contractor shall remove any existing telecommunications cabling in any space that is either abandoned or displaced as a result of the installation of new telecommunications infrastructure under this Statement of Work.

   (d) Material and work specified herein shall comply with the applicable requirements of:

      a. ANSI/ICEA S–80–576
      b. ANSI/ICEA S-83-596-1994
      c. ANSI/ICEA S-87-640-2000
      d. ANSI/TIA/EIA – 26–7–1998
      e. ANSI/TIA/EIA – 455–A-1991
      f. ANSI/TIA/EIA – 455–1.07
      g. ANSI/TIA/EIA – 455–50B
      h. ANSI/TIA/EIA – 525–14–A
      i. ANSI/TIA/EIA – 526–7–1998
      j. ANSI/TIA/EIA – 526–14–A–1998
      k. ANSI/TIA/EIA – 568
      l. ANSI/TIA/EIA – 569
      m. ANIS/TIA/EIA – 570
      n. ANSI/TIA/EIA – 598–A–1955
      o. ANSI/TIA/EIA – 604–3–1997
      p. ANSI/TIA/EIA – 606
      q. ANSI/TIA/EIA – 607

r. BICSI Telecommunications Distribution Methods Manual (BICSI TDMM)
s. CENELEC – EN 50173
t. CTO Standards and Practices
u. District Regulation
v. FCC 47 CFR 68
w. IEEE 802.3ab
x. ICEA S–90–661
y. ISO – 11801
z. NEMA WC–63.1–2000
aa. NEMA – 250
bb. CTO Standards and Practices

(e) All active equipment attached to the public switched telephone network (PSTN) shall be tested, accepted and registered by the Federal Communications Commission in accordance with the Commission's rules and regulations as published in 47 CFR 68.

(f) All cable and equipment shall be installed in a neat and workmanlike manner. All methods of installation and construction that are not specifically described or indicated by standard or practice shall be subject to the control and approval of the OCTO or OCTO's representative.

(g) The Contractor is responsible for obtaining any and all necessary permits and licenses to install wire and cabling within District owned or leased spaces.

(h) **Order of Precedence:** The installation and workmanship standards and practices of the District's Electrical Code, NEC, ANSI/TIA/EIA Standards and then the BICSI TDMM shall have precedence in the event of conflict. The Department of Consumer and Regulatory Affairs and the District Fire Marshal shall arbitrate all disputes regarding materials and/or the interpretation of installation standards and practices. Their decisions shall be binding on all parties.

(i) All cable runs shall follow normal building hallways and be installed either parallel to or orthogonal from building exterior walls. The Contractor shall use BICSI or Manufacturer's certified installers and provide the CTO with a manufacturer's warranted cabling system. All voice and data cabling systems installed under this Statement of Work shall carry a minimum of a 10 year warranty against failure due to materials or workmanship.

(j) The Contractor's installers shall have completed a minimum of 10 classroom hours or have accumulated 6 BICSI continuing education credits of copper and fiber optic cable installation training. The District recognizes only courses qualifying for continuing education credit or credit toward obtaining and/or renewing a BICSI Registered Communications Distribution Designer or BICSI Registered Installer designation. The Contractor shall provide copies of certificates of training on all personnel used on District projects upon request by the District.

(k) All Contractor personnel shall be readily identifiable through either uniform dress or identification badges. Identifying dress or identification badges shall be plainly visible at all times while on Government sites.

(l) The Contractor is responsible for maintaining a neat and clean work area. The Contractor shall remove and dispose of all trash and debris at the end of each

work period. The contractor is responsible for removal of all trash and debris from the work site. The use of government trash receptacles or trash removal facilities is prohibited unless specifically approved in writing by the agency.

(m) All ceiling tiles or access panels opened for the purpose of installing telecommunications cabling shall be closed at the end of each work period. The Contractor shall protect all desks and furnishings by protective coverings when working in occupied areas. The Contractor shall replace, at the Contractor's expense, any ceiling tile, access panel or other fixture damaged by Contractor personnel during the execution of this Statement of Work. The Contractor shall, at the end of each work period, remove any debris dislodged from opening and closing access panels and ceiling tiles from all surfaces, including floors before departing the facility.

(n) Collect and document project constraints, for cost, schedule and quality. Support analysis with graphical drawings, charts and other presentation instruments. Obtain approval from the District.

(o) Provide project management, administrative management and administrative support necessary for the work hereunder. This support shall be provided at no cost to the District, unless the District specifically pre-approves assignment of personnel dedicated to such tasks.

(p) Provide, and obtain approval for, a detailed project plan the Contractor will be responsible for following. The plan will show, item-by-item, how Contractor proposes to comply with the general and detailed scope of work items identified herein.

(q) Submit for approval a timeline schedule for performance of the work. The default format is MS Project 98. The timeline shall contain activity logic.

(r) Provide the baseline and updates of the schedule in printed and electronic form.

(s) Continuously communicate status of the work relative to the approved schedule.

(t) Provide schedule status information to the District when requested.

(u) Every two weeks provide an updated, statused schedule for Contractor's work.

(v) In order to provide quality control of Contractor's work, develop, obtain approval for, and execute a quality control plan.

(w) Provide periodic quality control oversight supervision of the work in this contract, by senior management personnel who are not involved in the day-to-day execution of the work hereunder. Report findings to the District manager, with proposed actions. Provide this service at least every two weeks.

(x) Provide District management timely information regarding possible problems and proposed action required to mitigate such problems.

(y) Prepare and present monthly reports, throughout the performance of Contractor work, setting out current and upcoming activities, decisions required and issues of concern. Timely, complete and satisfactory provision by Contractor to District of such reports shall be a condition precedent to payment of Contractor.

(z) Provide reporting and communications in copies and form requested by designated District manager.

(aa) Provide limited support after submission of deliverables and work products, as necessary to clarify the contents of deliverables to District staff and other contractors to the District.

(bb) Label infrastructure elements in accordance with ANSI/TIA/EIA – 606A "Administration Standard for Telecommunications Infrastructure."

(cc) Ground telecommunications equipment in accordance with ANSI/EIA/TIA – 607 "Commercial Building Grounding and Bonding Requirements for Telecommunications" and Article 800-40 of the NEC.

(dd) Provide two (2) bound copies of all cable certification reports and an electronic copy in Microsoft Word rich text format to the Office of the Chief Technology Officer.

(ee) Provide two (2) sets of "as-built" drawings to the Office of the Chief Technology Officer. The drawings shall plainly show the major cable path(s) used and identify each WAO.

III. DETAILED SCOPE OF WORK ITEMS

1. The Contractor shall:

(a) Install communications wire and cable listed as being suitable for the purpose and in accordance with Articles 770 and 800 of the current edition, NFPA 70, National Electrical Code. The Contractor shall abide by the installation practices referenced in the NEC, ANSI/EIA/TIA standards and the BICSI TDMM;

A. Horizontal Cable

1) The Contractor shall:

(a) Provide three (3) Category 5 (Enhanced) [Cat 5(e)] cables for data and voice to the user locations specified for all new installations. Cat 5(e) high performance plenum rated copper cabling shall meet or exceed ANSI/EIA/TIA – 568 – B, CENELEC EN 50173, ICEA S–90–661, NEMA WC-63.1 and ISO 11801 requirements. The primary data cable shall have a gray jacket. The primary voice telephone cable shall have a blue jacket. The swing cable shall have a white jacket. Additional cables shall have a unique color jacket for each cable;

(b) Exercise care when installing category rated cable. Cable shall not be subjected to a pulling tension greater than 25 LBF (40 Newtons), nor shall the cable be kinked at any point. Cables subjected to more than 25 LBF of pulling tension or exhibiting evidence of kinks, as disclosed by a discoloration or deformation of the cable jacket, shall be replaced.

(c) Terminate each voice and data cable on an 8 position, 8 contact (8p8c) un-keyed keystone style Cat 5(e) insulation displacement contact (IDC) jacks at the Work Area Outlet (WAO);

(d) Category 5(e) cable shall be independently tested by a third party to deliver proof the product will support Gigabit transmission in accordance with EIA/TIA 568–B and the IEEE 802.3AB standard. These tests must verify full compliance with the standards set forth in the EIA/TIA 568–A–5 specifications and ICEA S–90–661–1997 Cat 5X–100 Horizontal Cable specifications.

(e) Cable pair twist shall be maintained up to the IDC, terminating all conductors adjacent to its pair mate to better maintain pair characteristics designed by the cable manufacturer. Jacks shall be installed to provide minimal signal impairment by preserving wire pair twists as close as possible to the point of mechanical termination. The amount of untwisting in a pair as a result of termination to the jack IDC shall be no greater 0.5 inches (13 mm). The maximum amount of cable pair that shall be exposed from the cable jacket or sheath shall be 1 inch (25 mm).

(f) Category 5(e) cable shall be certified as having a maximum delay skew for all pairs of 25 ns or less.

(g) The primary data cable shall terminate on a Cat 5(e) IDC jack that is orange in color or identified with an orange icon/bezel at the WAO.

(h) The primary voice cable shall terminate on a Cat 5(e) IDC jack that is office blue in color or identified with a blue icon/bezel at the WAO.

(i) The swing cable shall terminate on a Cat 5(e) IDC jack that is office white in color or identified with a white icon/bezel at the WAO.

(j) Voice cables may be terminated on Category 5/5(e) 110-style IDC blocks or Category 5(e) patch panels at the telecommunications closet.

(k) All cable shall be tested and certified as exceeding the ANSI/EIA/TIA – 568 – A – 5 and TIA TSB-67 "TRANSMISSION PERFORMANCE SPECIFICATIONS FOR FIELD TESTING OF UNSHIELDED TWISTED-PAIR CABLING SYSTEMS" Level II requirements for basic link.

B. Riser Cable

1) Riser cable is defined as multi-pair cable having more than 4 pairs of 22 AWG to 24 AWG solid conductors with a thermoplastic insulating cover. The conductors are assembled into binder groups of 25 pairs that adhere to ANSI/ICEA S–80–576 color code.

2) Riser cable shall be designated as type CMR or CMP.

3) Riser cable used for voice communications shall be UL or ETL verified to meet all requirements of ANSI/TIA/EIA 568–B.2 Category 3.

4) Riser cable shall only be terminated on type 66 or type 110 blocks.

C. Backbone Cable

1) Backbone cable is defined as multi-pair cable to support inter-closet data links, cross-connect links between switch and hub equipment and patch panels as well as zone distribution cabling between wiring closets and multiple work area transition points.

2) Backbone cable used as risers shall be designated as type CMR.

3) Backbone cable used in horizontal configurations including zone cabling shall be designated as type CMP.

4) Backbone cable shall be UL or ETL verified to meet all requirements of TIA/EIA 568-B.2

5) Backbone cables shall not exceed the distances shown:

Maximum Backbone Distance			
Media Type	**Main to Horizontal Cross Connect**	**Main to Intermediate Cross Connect**	**Intermediate to Horizontal Cross Connect**
Copper (Voice)	800 m (2,624 ft)	500 m (1640 ft)	300 m (984 ft)
Multimode Fiber	2000 m (6560 ft)	1700 m (5575 ft)	300 m (984 ft)
Singlemode Fiber	3000 m (9840 ft)	2700 m (8855 ft)	300 m (984 ft)

D. Fiber Optic Cabling

1) All fiber optic cable shall meet the following transmission specifications:

Cable Type	Cable Type Wavelength (nm)	Maximum Attenuation (db/km)	Minimum Transmission Capacity (MHz* km)
50/125 micron multimode	850	3.5	500
	1300	1.5	500
62.5/125 micron multimode	850	3.5	160
	1300	1.5	500
Singlemode inside plant	1310	1.0	N/A
	1550	1.0	N/A
Singlemode outside plant	1310	1.0	N/A
	1550	1.0	N/A
NOTE: The manufacturer's documentation on the fiber's performance can be used to demonstrate compliance with the above performance requirements.			

2) Fiber optic cables may be used in lieu of copper cables for horizontal distribution designs, zone distribution designs, vertical (riser) cable and campus-wide outside plant (OSP) designs.

3) Outside plant optical fiber shall have a water block construction and meet the requirements for compound flow and water penetration. OSP cable shall have a pull strength of 2,670 Newtons (600 lbf).

4) Outside plant optical fiber cable shall support a bend radius of 10 times its diameter under no load (on reel), and 20 times the outside diameter the outside diameter when subject to the cable's rated load limit.

5) Fiber optic cables will be terminated using 568SC connectors as the primary connector type. Secondarily, LC style connectors, thirdly, MT-RJ connectors may be used if specified. In some instances, ST style connectors may be used providing the connector body is stainless steel and the ferrule is ceramic or zirconium. No other connectors may be used without a written exemption from the Director of Telecommunications, DC Government.

6) Multimode connectors shall be identified with a beige coloring of the housing or boot.

7) Singlemode connectors shall be identified with a blue coloring of the housing or boot.

8) Centralized cable designs joining horizontal cables to intrabuilding backbone cables shall:

    a. Use re-mateable connectors or splices;
    b. Allow mating in single or duplex fashion while managing fiber in pairs;
    c. Provide a method of identifying each position;
    d. Allow for the addition or deletion of connections;
    e. Provide a method to convert from an interconnection or splice to a cross-connect;
    f. Provide an access point for testing purposes;
    g. Provide storage for non-connected fibers; and,
    h. Provide adequate protection for the adapters, connectors, splices and cables.

9) Fiber Termination Units may be rack or wall mounted. Fiber termination units, including patch panels, shall:

    i. Cross-connect using patch cords;
    j. Interconnect premises equipment to either horizontal or backbone fiber cabling;
    k. Use standard colors to identify fiber groups as per ANSI/TIA/EIA – 606;
    l. Use standard colors to identify individual fibers as per ANSI/TIA/EIA - 606;
    m. Provide a means to access and test fiber optic cabling and premises equipment;
    n. Handle optical fibers and patch cords in a managed fashion; and,
    o. Protect fiber cabling, adapters and connectors.

10) Fiber optic splices shall exhibit a loss not greater then 0.3 dB when measured as per ANSI/TIA/EIA – 455 – 34.

11) Fiber optic patch cords shall be duplex in nature and identified in such a manner that one connector is marked "A" and one connector is marked "B". The connector at the opposite end of the patch cord will have the labeling reversed.

12) All optical fiber shall be tested end-to-end using an optical source and light meter. The test results will be documented for each individual strand with the source and meter at both ends of the strand under test. Additional testing using

an Optical Time Domain Reflectometer (OTDR) shall be available when requested.

E. Work Area Outlets

13) Provide jacks designed for 100 Ohm UTP cable terminations and are CENELEC EN 50173 compliant;

14) Provide jacks that are UL VERIFIED for TIA/EIA category 5(e) electrical performance and UL LISTED 1863 and CSA certified;

15) Ensure all jacks are compatible with EIA/TIA 606 color code labeling; and

16) Purchase only jacks that are manufactured by an ISO 9002 Registered Manufacturer. The manufacturer's jacks shall:

    p. exhibit a delay skew of less than 1.25 ns and a propagation delay of less than 5 ns.
    q. be an individually constructed unit and shall snap mount in an industry standard keystone opening (.760" x 580").
    r. be independently tested by a third party to deliver proof the product will support Gigabit transmission in accordance with EIA/TIA 568–B and the IEEE 802.3AB standard. These tests must verify full component compliance set forth in the EIA/TIA 568–B specifications.
    s. utilize multi-layer printed circuit board (PCB) technology and incorporated a signal cancellation/coupling design. Modular jack contact wires shall be formed flat for increased surface contact with mated plugs. Modular jack contacts shall be constructed of Beryllium copper for maximum spring force and resilience. Contact Plating shall be a minimum of 50 micro inches of hard gold in the contact area over 50 micro-inches of nickel.
    t. have a designation indicating C5e Plus on the nose that can be plainly seen from the front of the faceplate.
    u. fully encase and protect printed circuit boards and IDC fields.
    v. utilize a paired punch down sequence.
    w. The preferred vendor is Hubbell Premise Wiring.

17) Jacks shall be installed such that cables terminated to the jacks maintain minimum bend radius of at least 4 times (1" or 25 mm.) the cable diameter into the workstation outlet. Cables shall be terminated on jacks such that there is no tension on the conductors in the termination contacts.

18) The termination pattern shall be T568A.

19) WAOs shall be mounted to or in single-gang plates, double-gang plates or type 106 frames. Additional mounting options include the use of surface mount housings when installed at the termination of surface mounted raceway.

20) All WAOs shall be flush mounted using the appropriate adapter plates on installations in modular furniture. Surface mounted boxes shall not be used with modular furniture.

F. Patch Panels

1) Panels shall be ANSI/TIA/EIA-568-B.1, B.2 and ISO/IEC 11801 category 5e compliant.
2) Panels shall be CENELEC EN 50173 compliant and UL VERIFIED for TIA/EIA category 5e performance.
3) Panels shall be UL LISTED 1863 and CSA certified.
4) Panels shall be made by an ISO 9002 Certified Manufacturer. The preferred vendor is Hubbell Premise Wiring.
5) Panels shall be made of anodized .090 inch aluminum in 16-, 24 and 48-port configurations.
6) Panels shall accommodate 16 or 24 ports for each rack mount space or "U" (1U = 44.5 mm [1.75 in.]).
7) Panels shall be manufactured with a rolled-edge at the top and bottom for stiffness.
8) Panels shall be made of 8-port adapter modules removable by detaching three screws.
9) Panels shall have modular jacks employing staggered array contacts with a flat “hairpin” design made of Beryllium copper with a minimum 50-micro-inch gold plating on contact surfaces over 50-100 micro-inch of nickel compliant with FCC part 68.
10) Panels shall utilize the T568A wiring pattern.
11) Panel circuit boards shall be fully enclosed front and rear for physical protection.
12) Panels shall have port identification numbers on both the front and rear of the panel. The port identification numbers on the panel front shall be located so as to minimize obstruction by patch cords.
13) Panels shall have optional rear cable support bar for strain relief which shall clip to the rear of the patch panel.
14) The panel front shall have two raised panel identification label fields to accept ½” label inserts.
15) Panels shall have self-adhesive, clear label holders and white designation labels provided with the panel for each 8-port adapter.
16) Panels shall provide wiring identification & color code and maintain a paired punch down sequence that does not require the overlapping of cable pairs.
17) Panels shall terminate 22-26AWG solid conductors, maximum insulated conductor outside diameter 0.050”.
18) When utilized, data cable and swing cable patch panels shall be mounted on separate free-standing 84” x 19” floor mounted equipment racks. The Contractor shall maximize the use of existing equipment racks before installing a new equipment rack. Alternative mounting must be approved, in writing, by the OCTO.
19) Voice cables terminated on Cat 5(e) patch panels shall meet the same criteria as data cables for installation and testing.

20) Voice cables terminated on patch panels shall be mounted in the same rack or bracket as the swing cable.

21) When utilized, data cable and swing cable patch panels shall be mounted on separate wall-mounted swing brackets. Alternative mounting must be approved, in writing, by the OCTO.

22) The Contractor shall not install any patch panel having more than 48 ports or locations.

23) Swing cables shall be terminated on Cat 5(e) patch panels at the telecommunications closet. The patch panels may be wall or rack-mount as required.

24) Data cables shall be terminated on Cat 5(e) patch panels at the telecommunications closet. The patch panels may be wall or rack-mount as required.

G. Equipment Racks

1) The Contractor shall provide both vertical and horizontal cable management for all rack-mounted installations. The District requires a minimum of one horizontal cable management panel for both station and patch cords for each installed patch panel.

2) Racks shall be UL Listed and of aluminum construction with a black polyurethane or mil finish. They shall be 84" tall with a 15" base depth. Rack base shall be pre-drilled for securing rack to the floor. Racks shall have #10-32 or #12-24 mounting screws included in the package. Unused screws shall be bagged and attached to the rack with a tie-wrap.

3) Rack rails shall be spaced for either 19" or 23" mounting rail-to-rail and shall be of a U shaped construction with #10-32 or #12-24 pre-tapped holes in the EIA-310-D standard hole pattern providing 48 rack spaces on both the front and rear. Rails shall have a universal side drilling pattern to allow racks to be bolted together or attachment of accessories. Each rack space or "U" is 44.5 mm or 1.75" in width. Rack spaces are numbered from the bottom of the equipment rack.

4) The vertical cable management channel shall be comprised of three components: Vertical Channels, Steadfast gates, and covers.

5) The overall depth of the cable management channels shall be 10"

6) The surface finish shall be powder coat black or metallic silver as required to match equipment racks.

7) The vertical channel shall be comprised of two half-height sections of a fabricated "Z" profile (Z-Frame).

8) The Z-Frame shall be fabricated of 14ga. cold rolled steel.

9) The Z-Frame shall have 4" diameter front to rear cable pass through holes

10) The Z-Frame shall have a minimum of twelve sets of cable tie off points along its face for securing cable bundles running vertically.

11) The Z-Frame shall have formed hooks in its side allowing the channel to be easily fastened to the vertical upright of a rack.

12) Gates shall be provided to retain cable within the envelope of the vertical channel.

13) The gates shall fasten to the channel without the use of fasteners.

14) The gates shall have rolled edges to maintain bend radius of cable.

15) The gates shall have reinforcing ribs along the forward surface.

16) The gates shall be fabricated from 14ga cold rolled steel.

17) The gates shall be powder coated and match the finish on the equipment rack.

18) Covers shall not be fabricated from a polycarbonate, acrylic, or other flammable material.

H. Cable Pathways

1) Cable pathways shall be parallel to or orthogonal from the building exterior walls and shall follow main interior building hallways. Cable must be suspended above ceilings using cable tray, ladder rack, cable runway, “J” hooks or other approved devices.

2) The Contractor shall support all cables using approved devices. Approved devices include cable tray, ladder rack and/or 2-inch [5 cm] wide “J”-shaped hooks with rolled edges. Additional support devices may be approved after submission of qualifying documentation to the OCTO. A single 2” “J”-Hook cable support shall support a maximum of forty (40) cables. Ladder rack shall be constructed with a maximum spacing of 12” [30 cm] between cross-members.

3) The Contractor shall separate Category 5(e) cables a minimum of 5’-0” from all motors and transformers.

4) For cable not installed using cable tray or ladder rack, the nominal distance between cable supports is five (5) feet [1.5 meters]. Category 5(e) cables shall be separated from fluorescent lighting, ungrounded electrical power conduits and cables by a minimum of 12” [30 cm].

5) Conduit shall have a maximum of 270 degrees of bend between intermediate pull or junction boxes. The maximum distance between intermediate pull or junction boxes is 100 linear feet (30 meters.)

6) The maximum permissible fill ratio for conduit, raceway, ladder rack, “J” hook or cable tray is 40%.

7) Wire basket style cable tray shall be a continuous, rigid, welded steel wire 2” by 4” (50 by 100 mm) mesh cable management system with a T-welded wire lip for safety.

8) Cable tray, conduit, ladder rack or other continuous device used to support or route telecommunications cables shall be grounded in accordance with the requirements of ANSI/TIA/EIA 569, NFPA 70 NEC and District regulation.

9) The Contractor shall provide bushings or other suitable transition to protect the cable from abrasion and maintain bend radius control at the entrance and exit point of all conduits and raceways. The cable shall be protected from abrasion at all stress and transition points where the cable penetrates or enters raceway or cabinets through the use of appropriate grommet material.

10) The minimum bend radius for a single four-pair UTP cable is 1.5" [35 cm]. The minimum bend radius for cable bundles is 10 times the bundle diameter. The minimum bend radius for 25-pair or larger cables is 10 times the cable diameter.

11) Telecommunications cables that cross over electrical cable, ungrounded conduit and video cable will do so at 90° angles only.

12) The Contractor shall untwist no more than ½" [12 mm] of each cable pair in terminating a Category 5(e) cable.

13) The Contractor shall have no more than 1" [25 mm] of internal cable pair exposed from the outer cable jacket at the point of cable termination for four-pair UTP cables.

I. Fire Stopping

1) Cable penetrations through fire and/or smoke rated barriers shall not compromise the original rating of the barrier. All fire barrier penetrations shall be fire stopped with approved materials.

2) Cable penetrations into telecommunications closets shall utilize re-enterable barriers and barrier material.

3) The Contractor shall restore all wall and/or barriers used for cable penetration to their original appearance and ratings.

J. Labeling

1) Labels shall be unique and identify the Telecommunications space, patch panels, 110 / 66 blocks, fire stop devices, telecommunications grounding bus bars, cable and the cable type. The font used for all labels shall be sans serif with 10 point as the minimum font size.

2) All labels will consist of the following elements:

   a. *fs* – Telecommunications Space
   b. *fs-an* – Horizontal Link
   c. *fs-TMGB* – Telecommunications main grounding busbar
   d. *fs-TGB* – Telecommunications grounding busbar
   e. *fs1/fs2-n* – intrabuilding backbone cable
   f. *fs1/fs2-n.d* – intrabuilding backbone cable pair or optical fiber
   g. *f-FSLn(h)* – Firestop location (h) – rating in hours
   h. *b1-fs1/b2-fs2-n* – interbuilding backbone cable
   i. *bs-fs1/b2/fs2-n.d* – interbuilding backbone cable pair or optical fiber
   j. *b* – building
   k. *c* – campus or site
   l. *fs-UUU.n.d(q)* – intrabuilding backbone pathway element
   m. *fs1/fs2-UUU.n.d(q)* – intrabuilding backbone pathway between two TSes or areas
   n. *b1-fs1/b2-fs2-UUU.n.d(q)* – interbuilding pathway or element

3) Cable labels shall identify the floor (in multi-story installations), originating telecommunications space; patch panel or 110 / 66 block; the destination and the intended use (voice, data or swing.) The marking 2A-1-23S identifies the Swing (White) cable on the second floor of a multi-story building. This cable is

terminated on the second floor, Closet A, patch panel 1 and terminating at WAO 23.

4) Horizontal cables (4-pair) shall be identified with a clear Mylar over-wrap label (Brady type PTL-31-427 or equivalent.) Horizontal cables shall have the cable label attached within 6" (150 mm) of the termination.

5) Cables having 25 copper pair shall use a clear Mylar over-wrap label (Brady type PTL-21-427 or equivalent.)

6) Cables having more than 25 copper pair shall use a Brady PTL-12-109 or equivalent.

7) Fiber optic cables shall use similar labels as copper cables sized to the appropriate overall cable jacket.

8) Fiber optic flexible ducting (inner duct) shall be labeled similarly to riser cable.

9) Riser cables shall have labels identifying the riser cable number, floor served, terminating space and pair count.

10) Intra-space tie cables shall be identified with a label indicating the cable number, originating and terminating space and pair count.

11) All cables shall be identified with the same labeling information required at the termination point within 12 inches (300 mm) of passing through any barrier or fire stop device. The required label shall be on both sides of the pass-through or fire stop.

12) All cables installed in conduit or ducting shall be identified with the same labeling information required at the terminations point at all intermediate pull or junction boxes.

13) Each occupied position on 110 blocks is designated showing the Work Area Outlet (WAO). 2A-1-23V identifies either termination point for the voice (Blue) cable on the second floor, Closet A, 110 block 1, and at WAO 23.

14) Each occupied port on a patch panel identifies the served WAO. 2A-1-23D identifies either termination point for the Data (Gray) cable on the second floor, closet A, panel 1 and at WAO 23.

15) Each jack has the same designation as the originating 110 block or patch panel port. The font shall be sans serif and the minimum type size is 10 point.

16) Each WAO plate is identified on the face with a machine generated label identifying the serving TC. Each plate is identified on the reverse side with the same information handwritten in permanent marker. 2A-23 identifies the WAO plate where cables A23V, A23D and A23S are terminated at the work area.

17) Firestop location identifiers shall identify each installation of firestopping material. All firestopping location identifiers within a single facility should have the same format.

18) Each firestopping location shall be labeled at each location where firestopping is installed, on each side of the penetrated fire barrier, within 12" (300 mm) of the fire stopping material.

19) Firestopping labels shall contain the following information:

    a. Firestopping location identifier,

b. Location of the firestopping installation (e.g.: room number and location within room),
c. Type and manufacturer of firestopping installed,
d. Firestop material rating
e. Date of installation,
f. Name of Contractor installing the firestopping material,
g. Service record of firestopping location (e.g.: 04/22/2003 firestopping removed and replaced with same type by <Contractor Name> to add cabling runs.)

IV. MISCELLANEOUS PROVISIONS:

1. The District's Standard Terms and Conditions for contracts as defined by the Office of Contracting and Procurement shall apply.

2. Vendor shall procure and maintain, through the Term of this Agreement, at Vendor's sole cost and expense, the following types of insurance coverage:

   a) Employer's Liability insurance in a minimum amount of $100,000.00 as per 27 DCMR 2712.2. Bodily injury liability insurance in the amount of $500,000.00 as per 27 DCMR 2712.3. Auto liability insurance of $200,000.00 per person, $500,000.00 per occurrence for bodily injury, and Property Damage coverage of $20,000.00 per occurrence as per 27 DCMR 2715.5;

   b) Umbrella Liability Insurance in a minimum amount of $1,000,000.00;

   c) The DC Government shall be named additional insured and loss payee and Vendor shall furnish insurance certificates as evidence of coverage. Vendor will provide the DC Government with 30 days written notice of any cancellation in coverage. Carriers providing coverage will be rated by A.M. Best with at least an A-rating and a financial size category of at least Class VII. If Vendor fails to pay any premium for required insurance as specified herein, or if any insurer cancels or significantly reduces any required insurance without the DC Government's consent, at the DC Government's election, the DC Government may pay such premium or procure similar insurance coverage from another carrier or carriers, and deduct the entire cost (or part hereof) from the payment(s) due to Vendor, or DC Government may elect to terminate this Agreement pursuant to this Section.

3. The vendor shall procure any and all required construction and wiring permits and licenses required at no additional cost to the government.

4. Follow direction of single-point District Contracting Officer's Technical Representative, unless the representative expressly assigns a designee.

5. Promptly implement directives from the District's authorized representative to make minor modifications, additions and/or deletions to any portion of this scope of work. However, immediately advise the District in writing of any cost or schedule impact that may result from such District issued directives. If Contractor determines that there is additional cost or schedule slippage resulting from the directive, Contractor shall not act upon the directive, and shall not deviate from the approved plan, until the District issues a written change order.

Contractor shall not act upon any verbal directive that materially changes any aspect of this scope of work, irrespective of the source of such directive.

6. Throughout performance of the above items, coordinate with District employees, and other consultants and contractors employed by the District.

7. Contractor will follow the procedures and rules of the Government of the District of Columbia, and additional procedures that the District Representative may direct from time-to-time. Additional procedures from the District Representative shall be documented on official stationery.

8. Assign a senior manager as Contractor's chief representative for this project. This representative shall have the authority to make binding decisions between its organization and the other team members. S/He will be in charge of all members of the Contractor team assigned to the project and will be the main contact. All correspondence, conferences, meetings and questions concerning the project directed to the Contractor and its subcontractors will be through this person. This representative will be personally available at all times during working hours from the beginning of the work through its completion.

9. When proposing personnel under time-and-material work (either base contract or change orders), provide District information necessary for District to confirm that the proposed personnel are appropriate for assignment at the proposed hourly rates. Utilize the Chief Technology Officer's "Staff Nomination" form for this purpose.

10. Under time-and-material work (either base contract or change orders), (a) before any person on Contractor's staff may commence charging time to project under time-and-material terms (either base period or change orders), submit resume material to District and obtain approval for assignment of such personnel. Utilize the CTO's "Staff Nomination" form for this purpose. (b) Contractor may not invoice for more than 176 hours per month per person, unless express authorization is received for District. (c) Contractor shall submit weekly person-by-person time sheet in the form requested by District, and (d) provide a report every two weeks, indicating Contractor's estimated costs to date and Contractor's estimate of the cost of the work at completion.

11. The District may direct Contractor to remove any Contractor staff that District finds unacceptable, and Contractor shall immediately remove (and replace with new individual(s) satisfactory to District, if requested) such personnel.

12. Contractor may incur reimbursable costs under this agreement, provided Contractor follows the procedures set out on attached "Staff Nomination" form. Pre-approved expenses (including subcontractors) are passed through at cost, with no mark-up.

13. Prepare detailed agenda and minutes of meeting for all meetings called or chaired by Contractor. Such agendas shall identify in detail the specific items planned for discussion, and shall be distributed to proposed attendees well in advance of affected meetings. Such minutes are to set out responsible parties for action items, particularly decisions required by the District, including deadlines therefore, and the minutes shall record decisions made and the basis for each such decision.

14. During performance of work and/or at the completion of work, provide orderly hand-over of work products and deliverables to designated District representative.

15. Provide, at no cost to the District, portable computer equipment that is compatible with OCTO LAN system for use by Contractor personnel.

16. Provide space, equipment, storage, personnel and systems in Contractor's offices as necessary to support the work hereunder.

17. Any and all Contractor-produced work products and deliverables, including all documents, graphics and software that are produced by Contractor in connection with this scope of work become the exclusive property of the Government of the District of Columbia. Contractor, by acceptance of this scope of work, provides an exclusive and indefeasible license and copyright for unlimited use, copy and distribution by the District of subject work products and deliverables, in hard coy and/or soft copy (e.g. electronic, magnetic recording, etc.) form. Contractor shall deliver to the District camera-ready hard copies and softcopies (on 3.5" diskette or CD-ROM) of all such work products and deliverables.

V. SCHEDULE (TIME OF PERFORMANCE)

This scope of work will be performed on an expedited basis, in accordance with the following timeline schedule. In addition to periodic activities and deliverables required by the above scope of work, each activity must be completed and approved by District within the following number of workdays (measured from the initial Notice to Proceed for the work as a whole).

<Try to have at least one milestone every six weeks>

Activities	Work Days from NTP
Develop and submit plan and schedule	1
Fully complete and submit all work, except for post-contract support	

A. Acceptance

Government acceptance is defined as:

1. Joint walk-through and inspection resulting in the compilation of a final punchlist;
2. Government sign-off of an acceptance letter; and,
3. Receipt of Cable Certification Reports and "as-built" drawings.

Government walk-through and inspection will be completed within 10 business days of the Contractor's written notification of project completion.

VI. COST PROPOSAL

This Scope of Work will be performed on a Firm-Fixed-Price Basis unless agreed to in writing by a District Contracting Officer. Provide an estimate for the scope of work described herein.

1. Break down cost of labor by discipline and hours and by activity.
2. If proposing firm's rates are listed in Federal GSA Schedule, provide cross-reference to the appropriate Schedule and utilize rates no higher than the rates therein.
3. Provide resumes and other support information necessary to prove that proposed personnel meet the qualification requirements in the proposed GSA Schedule rates or other source document.
4. Break down other costs into subcontractors, travel expenses, reproduction services, shipping, etc.
5. Provide plan for satisfaction of District LSDBE requirements.
6. Provide a statement regarding the general approach proposed by offeror. Ensure that the approach includes an organizational chart and proposed duration of assignment for each person involved.
7. Provide resumes for all key personnel proposed.

VII. Award Decision: The selection of the awardee of this work will be made by District staff using their best business judgment regarding which offeror has proposed the most advantageous offer, based on a balanced consideration of cost and technical factors including the following:

1. Qualifications of proposed personnel relative to the requirements of this Scope of Work.
2. Past performance of the offeror and/or its proposed team members.
3. Proposed cost estimate or fixed price proposal and support that indicate an understanding of the scope of work and the risks inherent therein.